Additional Classified on Page 19

SELL: 2 HEADED TD with base-14 Typing Reperf excellent both with manuals. John Bicek K91E1 6841 W. 176th St. Tinley Park, Ill. 60477 Tel. 312 532 2517

SELL: MODEL 15 KEYBOARD with punch and EOL and counter. Perfect. Dave Holmes W9EKB Otto Twp. Kankakee, Illinois 60901 Tel. 815 932 1314

MODEL 28 TYPING UNITS, good operating condition $100. each. #28LBXD T.D.s, with bases $40. Complete AFSK oscillator/transmitter, AN/FCC-3, with AC power supply, DC loop supply; 19" rack mount x 5 1/2" high; set for 170 cps shift or plug in your own $18. each. Companion demodulator with plug-in filters, ac, loop supplies $18. each. 19 inch rack blowers $10. each G. White, 5716 N. Kings Hwy. Alexandria, Va. 22303

WANTED: TWO MOTORS and information - Western Union Model 101-A as pictured on page 33 "73" RTTY Handbook. Please contact W7AAI, 2611 Liberty St. North Bend, Ore. 97459

WANTED-MODEL 28 KSR, must be complete with console. Will pay cash if the price is right. W4AIS, George Tate, 7 Artillery, Taylors, S.C. 29687

FOR SALE: MODEL 15; Model 14 TD; Model 14 Typing reperf with keyboard; Teletype Corp. power supply. All in good condition $150 firm. H. L. Graham, MD. 930 Rosedale Ave., Capitola, Cal. 95010

WANTED: TELETYPE EQUIPMENT & parts; R388, R-390A, SP600, 51J-4. Cash or trade for new radio equipment. Alltronics-Howard Co. Box 19, Boston, Mass. 02101. Tel - (617-742-0048)

WANTED BADLY: Parts manual and adjustments for model 26 page printer. Manuals must be complete. N.C. Brust, WAOIVN, 6654 W. 38th Ave. Wheat Ridge, Colo. 80033

REWARD FOR INFORMATION leading to procurement of manual on Yuba-Dalmotor mobile linear and power supply. Ray Brougher, W4IK, 3743 Wesley Dr. Montgomery, Ala. 36111

WANTED: TELETYPE EQUIPMENT & parts; R388, R-390A, AP600, 51J-4, Cash or trade for new radio equipment. Alltronics-Howard Co. Box 19, Boston, Mass. 02101. Tel - (617-742-0048)

SELL: TS-383 B/GG DISTORTION Test Set in excellent condition, $150. 3 ply page printer paper $7.50/ case. (50 lbs. shipping wgt.) Bob Friebertshauser, WB2PLY, Box 207, Princeton, N.J. 08550

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RTTY JOURNAL

EXCLUSIVELY AMATEUR RADIOTELETYPE

Vol. 16 No. 4 30 Cents

Ray Morrison W9GRW Retires *after 41 Years With Illinois Bell.*

The following information on one of the pioneers of RTTY in the country was furnished by Phil Haller, W9HPG - Director Central Division of the ARRL.

•••••

Born 6-22-04 in the Belgium Congo, of Missionary parents.

Ray attended the University of Illinois, where he met and married Margaret Bassett in 1928.

Ray became interested in amateur radio during his college days and was licensed in 1928.

World War II came along and Ray, in the U.S. Naval Reserve, was in the service for three years, serving mostly in the Pacific area, and is now a Lt. Commander, Retired, USNR.

With his return to amateur radio in the early 50's, Ray became interested in RTTY and soon became known as 'THE' RTTY man in the Chicago area. With the help of a couple of his amateur friends, parts and machines were found and distributed to others. They formed a club - Chicago Area Teleprinter Society - to get the RTTY amateurs together so that their 'know-how' could be passed on to others. Ray became an expert on teletype equipment, and took part in many programs at Clubs and Conventions.

About 6 years ago Ray decided it would be a fine thing if he could help blind people to use RTTY equipment. He set about learning the Braille System, getting instructions at the Hadley School for the Blind. Soon he was helping the school and another one at Wheeling, with repairing of their Braillers. Doing his own engineering and design work, Ray soon had a setup that would print out Braille from standard 5 level RTTY signals or tape.

With 41 years of service behind him, Ray retired February 29th, from IBT. Ray and Margaret have gone to Sun City, Arizona, to live, and we are sure he will be back on the air there soon, eventually with a W7 call.

We in the Chicago area will long remember our good friend and willing helper, Ray Morrison, W9GRW. Our best wishes for a happy retirement.

••••

Send GOOD C W From Your TD !

JERRY HALL, K1PLP
15 Endleigh Ave.
Pinehurst, Mass. 01866

"Well," you say after reading the title, "I've heard some of that TD CW stuff, and it's hardly even recognizable as code." But not so with this method! The characters are perfectly proportioned Morse code, sounding like a very well adjusted electronic keyer, or like the W1AW code practice tapes. "Okay," you say, "but I don't want to butcher up my TD and ruin it for normal use." The beauty of this system is that after very slight modification (which can be removed in a few minutes), the tee dee works in this application, but its normal use for RTTY is not affected.

The system uses three relays. One acts as the keying relay. A second relay is used to turn on and latch the keying relay upon command from the tee dee. The third relay is energized by a separate command from the tee dee, and unlatches or turns off the keying relay. Dots and dashes are formed by altering the times between turn-on and turn-off commands, through appropriate letter combinations on the tape.

In normal operation for CW keying, one teleprinter character, 163 milliseconds in duration at 60-speed, is used for a Morse dot and its succeeding space. Thus, a string of dots will occur at the rate of about six per second. A dash and its succeeding space, timewise, occupy two teleprinter characters, so a string of dashes will occur at the rate of about three per second. For a 60 w.p.m. tee dee, this equates to a maximum CW keying rate of about 13 w.p.m. Of course, by allowing more time between turn-on and turn-off commands or using long spaces between CW letters, slower CW rates can be used.

Figure 1 shows a typical wiring diagram for installation of the relays. The coil of the energizing relay, K2, is placed in series with the tee dee commutator segment for the first selector pulse. As a tape is played through the tee dee, any character containing a mark in the first selector pulse position will energize this relay, which in turn energizes K1, the keying relay. K1 latches itself closed.

The coil of relay K3 is placed in series with either the fourth or fifth selector pulse commutator segment, at the builder's preference. The fourth position gives a lighter dot weighting than the fifth. A character containing a mark in these selector pulse positions will briefly energize K3; de-energizing K1.

The relays used for K2 and K3 should either have low impedance windings and be capable of carrying the full amount of loop current, or else should be shunted with resistors to conduct a part of the loop current. Surplus 24 or 28 volt relays, properly shunted, work admirably for K2 and K3, and without a shunt for K1.

To punch a tape for transmission of CW, simply punch the letter "B" for a dot, and punch "UM" for a dash. Although other characters will also yield the desired results, the B's and UM's have short and long sounds, so instead of muttering "dit dah dit" to yourself as you are punching, you can mutter "B UM B". Use a spacebar function for spacing between CW letters, and use three spaces between CW words. (Blanks may be used instead of spaces, but I prefer the character separation the space function gives on a typing reperf). A tape punched for the CW identification DE K1PLP would read like this, occupying about 4-1/2 inches of perforated tape:

UMBB B UMBUM BUMUMUMUM BUMUMB BUMBB BUMUMB.

You may find it convenient to use a tape loop with your CW call letters at the beginning, followed by a U and several blanks, then an M, call letters, and a CW "K". The U after the first set of call letters provides a turnon signal for the keying relay, with no immediate turn-off signal. Stopping the tape here, during the blanks, will leave the CW relay turned on for your entire transmission, if made from the keyboard. Completing the playing of the tape will turn off the carrier and then provide the necessary CW identification at the end of your transmission.

One thing is important if your FSK input is permanently wired into the transmitter -- it must be disabled while playing the CW identification tape! Otherwise, you will end up with simultaneous A-1 and F-1 emission, likely an invitation to hear from an F.C.C. monitoring station!

Special acknowledgement and thanks go to Frank VanCleef, W1WCG, for interesting me in this system and for providing enough information to permit completion of my own installation.

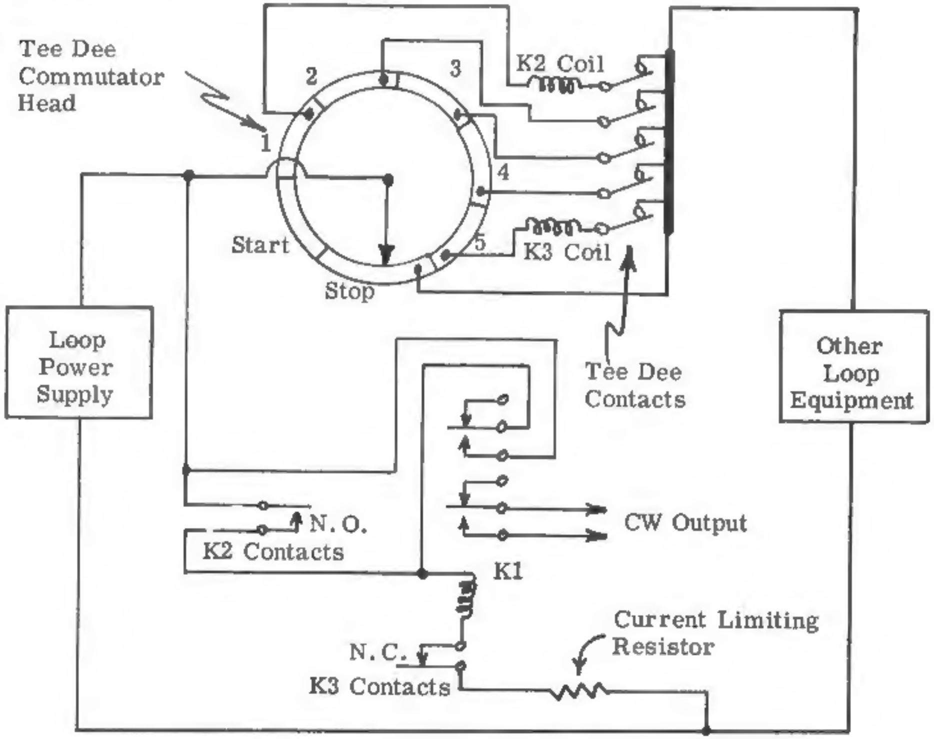


Figure 1. Typical Relay Installation

* * *

ELECTRICAL Shift of FSK for Upper or Lower Sideband

by Ray Popkin-Clurman W2BK(exW2LNP)

The usual arrangement for those side band exciters that reverse sidebands between 80 and 20 meters requires two separate diode shifters. (See Fig. 1)

This simple arrangement shown in Figure 2 will allow you to electrically reverse the diode for either band and then the un-needed shifter may be set for 170 Hz on all bands.

The DPDT switch in figure 2 electrically reverses the shift, not physically, but by adding one by-pass condenser to the circuit. If you have two circuits now simply change them to figure 2, set one for 850 and the other for 170.

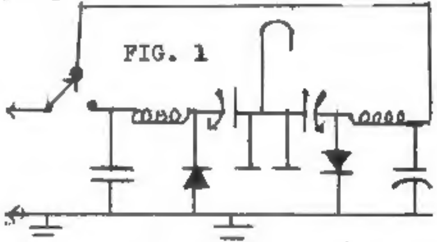


FIG. 1

Usual FSK Circuit

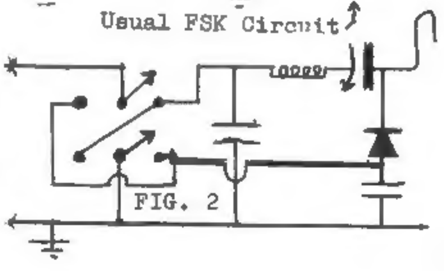


FIG. 2

Receiving RTTY Signals

IRVIN HOFF, W6FFC
12130 Foothill Lane
LOS ALTOS, Cal. 94022

Part 2 of a series of articles on receiver tuning for RTTY. See June 1967 RTTY JOURNAL for first article covering basic problems.

* * *

We have pretty much covered the whys and hows and wherefores, but now to practical application. Let's discuss variable BFO's a moment. Since most of these usually move to 3-4 khz each side of center, little more need be said on them, other than how to KNOW when you are in the right position. That's a problem sometimes, particularly since you usually move it now and then, and like setting the FSK shift to exactly 850, once you change the knob, away you go again with something different. Basically, the best way to adjust the variable BFO is to set it where you think it should be, then tune in MARK for maximum display on the demodulator's indicator. Then without doing anything to the receiver, put the transmitter on SPACE -- the "S-meter" may go up or down. If it does, the BFO is not properly adjusted. This is perhaps over-simplifying things to some extent, but basically this method is at least as satisfactory as some others. Make an adjustment on the BFO, retune MARK signal, and again note the "S-meter" before and after going to SPACE signal on the transmitter. Eventually you will find the best setting of the BFO. This DOES NOT MEAN you will then get equal AUDIO OUTPUT from the receiver for both MARK and SPACE, but it DOES MEAN you will be getting equal MARK and SPACE frequencies through the i.f. system. If the AUDIO tones are then of different amplitude, this simply means the manufacturer didn't assume anybody needed audio tones much above 2000-2500 hz and either didn't use very high quality components to pass the higher tones or else added tone networks to roll off the audio above 2000-2500 hz on purpose. In this case, write the manufacturer and see what he recommends.

When using the 500 hz position and a variable BFO, things can become very tricky, especially if you tend to move the BFO setting from one day to another. This is something you'll have to live with if you have a variable BFO.

Some receivers have a variable passband tuning rather than a variable BFO. These receivers are becoming extinct other than the Drake brand. The 2-B and R-4 receivers have this "passband" tuning as does the Collins 75A-4. This can be very nice for certain things, but in the long run I do not miss these features myself, and I have owned a 75A-4, a Drake 2-B and a Drake R-4. I also have a receiver at present with variable BFO and what a nuisance that is! For myself, I prefer having a fixed-freq. BFO which is ALWAYS correct and the only thing left to do after switching to the proper position is to merely tune the receiver to the right frequency.

Another feature of having a fixed-freq. crystal-controlled BFO is the added stability that is achieved. Some BFO's are in the 50 khz region to achieve additional stability -- these BFO's are of course of the variable type. However, even with zener-regulation, and all the latest tricks that the industry has discovered such as use of varicaps, etc., I for one believe none of these systems can match a crystal controlled stage for frequency stability. I have a receiver here that will stay within 10-15 cycles of a given frequency by the month, and although this CAN be achieved with a variable BFO, it is not likely to happen. So if you are contemplating using "autostart" on a fixed frequency where you would like to achieve maximum stability, at least investigate the use of a receiver with a fixed-frequency crystal-controlled BFO.

Now if you have a transceiver that normally gets 300-2400 hz audio output or something similar, you can change this to get 2975 easily enough -- it might require a slight addition to do this -- W7ARS has done this in a most interesting manner. His receiver is an extremely expensive all-band Collins 51S-1 -- most of you probably never even heard of such a receiver. Walt wanted to get RTTY, so he bought a 452.450 crystal, but there was no place to put it. He built a small bracket which he added to the receiver in such a manner as to not hurt its resale value, and put a small DPDT switch plus two crystal sockets on the bracket. The one crystal was the original 453.650 for lower sideband and the other was the new 452.450 for RTTY. The switch merely selects between the two -- the only thing inconvenient about the arrangement is that he has to raise the lid to operate the switch, a minor inconvenience, but the resale value has not been impaired, and he now has RTTY and SSB both available. This is one example and it will probably give you ideas how your present receiver can be "converted" easily for RTTY.

The Drake 2-B receiver has passband tuning but unfortunately the arrangement does not go as far as 2550 hz from the center frequency for lower sideband. Thus you are "hurting" to get 2975 on the Drake 2-B. Bob Weitbrecht W6NRM has long been a champion of the Drake brand, and soon after getting his first 2-B (he likes them so well for RTTY he now owns two!) he modified it slightly to go further off frequency for optimum RTTY reception of 2125 and 2975 tones. He wrote an article including this modification in the July 1962 RTTY -- it involves the addition of a 470 pf. capacitor.

The Drake R-4 was manufactured with RTTY specifically in mind, and DOES get 2550 hz. from center on LOWER sideband (it won't go that far off on "upper" but it's not needed there). Other features of interest on the Drake R-4 are the 400 hz (170 shift) and 1.2 khz (850 shift) positions. Probably the best all-around receiver for RTTY for the money on the market today.

Now for the Collins S-line. The 75S-1 is a really fantastic receiver in the author's opinion. There will be those with 75A-4's, etc. who will disagree but I have had one of those also and still like the S-line much better for RTTY. (Hardly anybody likes a 75A-4 in "stock condition" for SSB, but they love them for CW). Anyway, the 75S-1 comes with a fixed frequency crystal-controlled BFO. It has a 2.1 khz mechanical filter and a 456.350 upper sideband and a 453.650 lower sideband crystal to get 300-2400 hz. in either mode. HOWEVER, it has a CW position where you can insert any other mechanical filter (and proper crystal for the purpose needed) you desire -- usually a 500 hz filter for CW. Actually you can put in either a 500 hz for 170 shift or a 1500 hz for 850 shift. This filter (and supplemental crystal) switches in automatically whenever you go to the "CW" position. You then buy a 452.450 crystal for 850 shift with the 1500 hz filter or a 452.790 crystal for 170 shift with the 500 hz filter. The only problem with the 75S-1 is you can only add one of the two filters. Normally that is no problem. You could if you want, use the normal 2100 hz SSB filter for RTTY (using lower SB position and W7ARS's idea of switching the two xtals with an external switch) and then use the CW position with the 500 hz. filter and matching 452.790 crystal for 170 shift. (If you are REALLY ambitious, it is possible to add both the 1500 and 500 hz filters in the 75S-1 in addition to the normal 2100, but you must sacrifice the "AM" position to do this. In this case it is usually more simple to get the 75S-3B which has room for two additional filters to start with.)

If you don't buy any additional filters for the 75S-1, you can still rewire the switch to use the 2.1 khz filter in the CW position where the new 452.450 crystal has been added. This is a simple addition to make and it was intended all along that the customer could do this. However, it may be a little more simple in the long run to use the W7ARS idea of one external switch that would select between the two crystals while keeping the receiver in the "lower" SB position. Collins has a Bulletin 523-0182000-002211 on RTTY operation of S-line Equipment and installing the extra crystal.

The 75S-1 has been superceeded by the 75S-3 and now by the 75S-3B receivers. (The 75S-2 is just a 75S-1 with extra bank of crystal sockets to get an additional 14 selections of 200 khz segments -- the 75S-3C being a 75S-3B with the extra crystal bank, and the KWM2/A being a KWM2 with the extra bank also. These receivers are particularly beneficial to the RTTY man who may like to monitor commercial RTTY frequencies or "MARS" or both.)

The 75S-3 has an added feature, a 200 hz crystal filter for CW, plus a variable BFO that gets from about plus-and-minus 3.0 khz either side of 455.000 khz.

The 75S-3B has room for two additional optional filters, plus a little different power supply from the 75S-1 that is zener-regulated. It also has the same variable BFO of the 75S-3.

Either the 75S-3 or 75S-3B may be used with or without the variable BFO. The same crystals we have been discussing (452.790 for 500 hz filter on 170 shift and 452.450 for 1500 or 2100 hz filter for 850 shift) may be added to the 75S-3B for fixed BFO operation, even though the variable BFO may be used if desired. This gives an "always right" BFO setting.

The KWM-2 poses another problem although it can be readily used on RTTY. Generally speaking, the use of transceivers will create more problems than they solve, and in any event it is nice to have a separate receiver for RTTY purposes.

CRYSTALS

The following comments are added primarily to assist people in obtaining the crystals mentioned above. At least four crystal companies are well known to amateurs: (1) International Crystal, (2) Bliley, (3) Texas Crystal and (4) Knight. Information can be obtained from the sales department for any of these companies. I shall include order instructions and cost of the International Crystal Co. since I have had the most experience with that firm.

For frequencies around 455 khz, each crystal will cost $13 for a 0.01% tolerance (about 45 cycles plus-or-minus at that frequency) or $15 for a tolerance of plus-or-minus 0.0025% (about 11 cycles). Both crystals have the same drift co-efficient over a temperature range of -30° to $+60^\circ$C. Here would then be a typical order:

A. Crystal Frequency 452.450 khz (for 850 shift)
B. Type ordered GP ($13) or CS ($15)
C. Calibration Temp. 25°C (Room temp. inside receiver)
D. Holder HC-6/U or F-700 if you want soldering wires instead of plug-in pins.
E. Circuit Load 20 pf. (for Collins S-line receivers)
F. Your name and address.

Send to International Crystal Manufact. Co.
18 North Lee
Oklahoma City, Oklahoma 73102

The crystals will be air-mailed in a special plastic foam container that will assure their safe arrival. HOWEVER, crystals in this frequency range will take from 2-3 weeks to manufacture - don't ask me why, since their "normal" frequency crystals are usually made up in one or two days.

SUMMARY

A receiver need not be limited to "300-2400" cycles audio even if it uses a fixed-frequency BFO with no front-panel adjustments. Most receivers could receive up to and even beyond 10,000 cycles audio if a different BFO frequency were selected. In the case of a crystal BFO such as is used on many newer receivers, it usually only takes one additional crystal to receive RTTY in a superior manner. This crystal can easily be added without harming the resale value in any manner. This crystal will probably cost around $13, but once added will give years of satisfactory RTTY reception.

Many receivers have a variable BFO which should allow rapid and satisfactory RTTY reception.

The author happens to prefer receivers having fixed-freq. BFO's, since once the proper crystal is added, then receiving RTTY becomes a matter (simplifying tuning in the signal with no worries about proper BFO alignment. (This, is similar to having a "fixed-shift" RTTY Keyer in the transmitter rather than a "shift-pot" arrangement which needs readjusting from day to day, and is inherently less stable for maintaining a frequency.)

Information was included for ordering a suitable crystal and the address of one company was also noted.

THE FUTURE

Since various receivers have considerably different circuits, if enough interest is raised by this article, additional articles can be prepared demonstrating how a specific receiver can best be used on RTTY. Contact the editor if you would care to see such an article, or would be interested in assisting the preparation of such an article. This latter might include the submission of your receiver's circuit diagram and a willingness to try suggestions for that receiver toward the preparation of such an article.

* *

Delaware Valley Organizing RTTY Society---

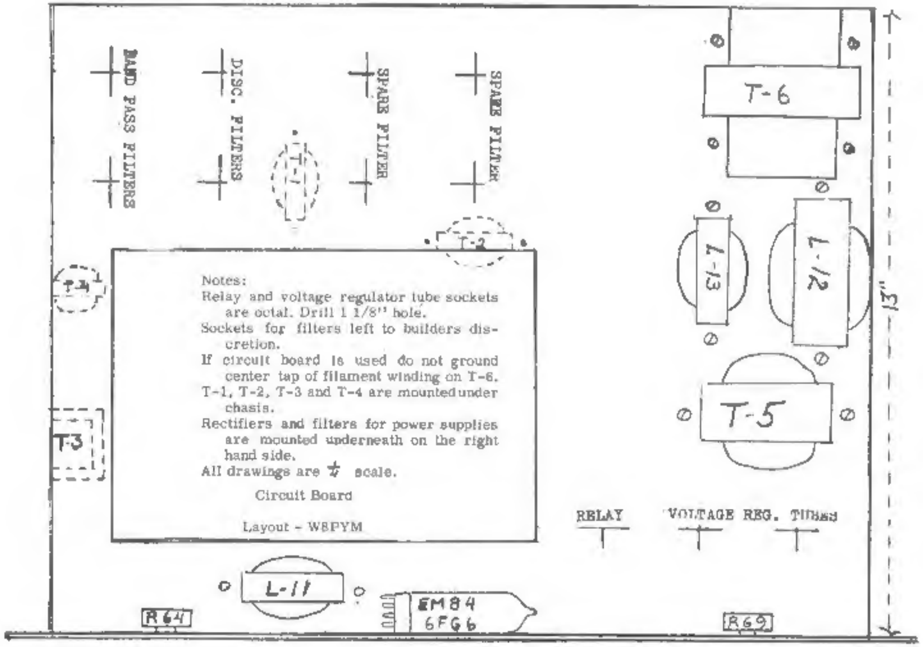
Dick Urian, W3CRO and Phil Catona, W2JAV pioneer RTTY hams have agreed to assist in the formation of a RTTY society in the Delaware Valley area. With specialized problems an association of RTTY fans can accomplish more with a separate group than in more general clubs. The area is to include New Jersey, Delaware and Eastern Pennsylvania.

The first organization meeting will be held Monday, 8 P.M. April 15th, at the National Park Boro Hall, Grove and Lakehurst streets, National Park, N.J. More information can be obtained by writing - RTTY Organization Committee, 560 Barlow Ave. Woodbury, N. J. 08096.

* *

Suggested Layout For TT/L-2

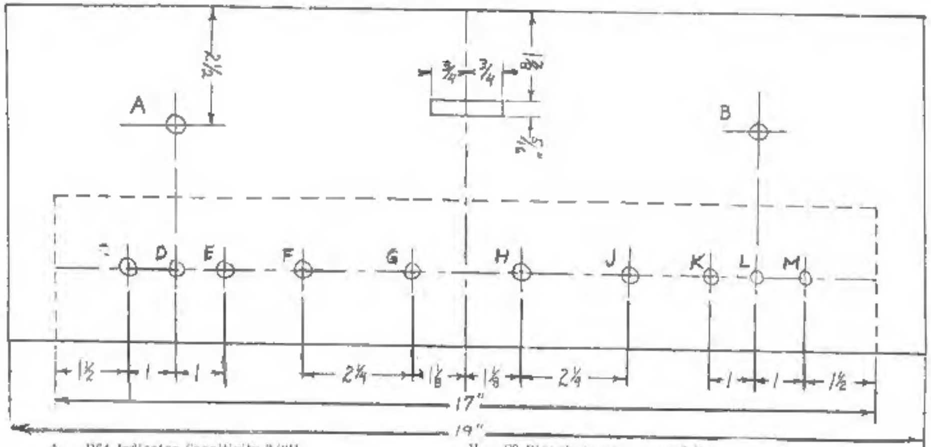
From experience we dislike reducing drawings to small size. The number of requests for a sample layout of the TT/L-2 demodulator however gives us courage to try the layout sent to us by W8PYM. It follows the general layout of most that we have seen and is reproduced approximately one quarter size in case the figures do not reproduce clearly.



Notes:
Relay and voltage regulator tube sockets are octal. Drill 1 1/8" hole.
Sockets for filters left to builders discretion.
If circuit board is used do not ground center tap of filament winding on T-6.
T-1, T-2, T-3 and T-4 are mounted under chassis.
Rectifiers and filters for power supplies are mounted underneath on the right hand side.
All drawings are ¼ scale.

Circuit Board

Layout - W8PYM



A - R64 Indicator Sensitivity 3/8"
B - R69 Auto-rcve Sensitivity 3/8"
C - S1 Bandpass switch 15/32"
D - 4 NE-51 Stby Light 11/16"
E - S6 ADC/ATC 15/32"
F - S5 Low pass filter 3/8"
G - S2 Limiter In-Out 3/8"
H - S3 Discriminator Switch 3/8"
J - S8 Function Switch 3/8"
K - S4 Normal-Reverse Switch 15/32"
L - 3 NE-51 Receive Light 11/16"
M - S7 Power Switch 15/32"
Knobs - Harry Davies 4108 (2), 4104 (4)
Panel - Aluminum 1/8 x 7 x 19 rack mount

Adjusting Polar Relays ----

Efficient operation of the RY20, the RY28 or the RY30 relay in printer circuits depends upon a periodical routine of inspection, cleaning, and adjustment. The adjustments are so interrelated that it is essential for each adjustment to be made in the given sequence. If any adjustment is changed, it will be necessary to check all subsequent adjustments.

NOTE:

Before cleaning or making any adjustments, loosen both pole-piece screw lock nuts (knurled tension knob on RY30 relays) and back off both pole-piece screws as far as possible. Back off both contact screws.

ADJUSTMENTS (See Figure 1)

TO CLEAN RELAY AND COVER

Remove the relay cover and blow out any accumulated dust. Wipe the relay and the cover with a clean soft cloth.

TO CLEAN CONTACTS

Pits and build-ups on the contacts should be removed with a contact file. (Back out contact screws to permit entrance of contact file). When cleaning the armature contacts, the armature should be supported at its midposition by the opposite contact screw, to avoid bending the armature or the contact springs. Care should be taken in filing the armature contacts to use light pressure. After using the file, blow out any loose particles and polish the contacts with a burnisher.

TO REMOVE MAGNETIC PARTICLES FROM THE ARMATURE AND POLE-PIECE SCREWS

Any particles adhering to the armature or pole-piece screws should be removed by pressing a fresh piece of friction tape, wrapped around a piece of thin stiff non-magnetic metal, against the particles. Do not rub the tape against the armature or pole-piece screws as this will leave a residue which will collect further particles.

POLE-PIECE SCREWS AND RELAY TERMINALS

Make sure that pole-piece screws and relay terminals are clean.

ARMATURE ADJUSTMENT

The armature should not touch the inside of the spool and the contacts should align so that the centers of the contacts will not be out of alignment by more than 25% of the contact diameter.

To adjust, loosen the screws holding the spool heads to the relay frame and position the spool to meet the first requirement. Tighten the screws. Loosen the armature clamping screws (Figure 1) and position the armature both vertically and horizontally to meet the latter requirement. Tighten the screws.

NOTE:

If necessary, position the contact screw brackets by means of the enlarged mounting holes in the relay frame to aid in meeting the latter requirement.

*ARMATURE CONTACT SPRINGS ALIGNMENT

The armature contact springs should be parallel to the armature and the tips of the armature contact springs should rest against each other, approximately flat across their width, with a pressure of 20 to 50 grams measured on one spring at the contact with the other spring held so that it cannot follow its mate. If necessary, back off the contact screws. To adjust the tension of the armature contact spring, bend the spring toward or away from the other contact spring as required, and as close as practicable to the point where it is riveted to the armature. Reset the contact screws.

CONTACT SCREW ADJUSTMENT

The clearance between the armature in its normal unoperated position and either contact screw should be approximately equal and when the armature is held against one contact screw, there should be .003" to .005" clearance between the armature and the other contact screw.

To adjust, back off the pole-piece screws as far as possible and position the contact screws to meet this requirement.

NOTE:

The contact screws should be sufficiently tight in their brackets to hold any adjusted position. If necessary, remove the contact screw from the bracket and force the two portions of the split end of the bracket closer together to meet this requirement.

POLE-PIECE SCREWS ADJUSTMENT REQUIREMENTS:

*(1) When the armature is held first against one contact screw and then against the other, the armature stop pins should not touch the pole-piece screws.

(2) The armature should be centered in the magnetic field between the pole-piece screws, i.e., the armature should either "float" in the gap between the contact screws, or, it should stay against either contact, with approximately the same pressure when moved there by hand.

PROCEDURE:

(1) Back off both pole-piece screws and check the contact screw adjustment. Readjust if necessary.

(2) Advance the right pole-piece screw until, with its locknut tight (knurled tension know on RY30 relays), the right pole-piece screw pushes the armature far enough to just touch the left-hand contact screw. Back off the right pole-piece screw approximately 1/4 turn from this position until REQUIREMENT (1) is met. Tighten the locknut.

(3) Advance the left pole-piece screw until REQUIREMENT (2) is met. Tighten the locknut. If this disturbs the adjustment, reposition the left pole-piece screw and retighten the locknut to meet the requirement.

NOTE:

When adjusting the pole-piece screws on RY30 relays, the knurled tension nuts should be sufficiently tight to hold the pole-piece screws in the adjusted position.

* * *

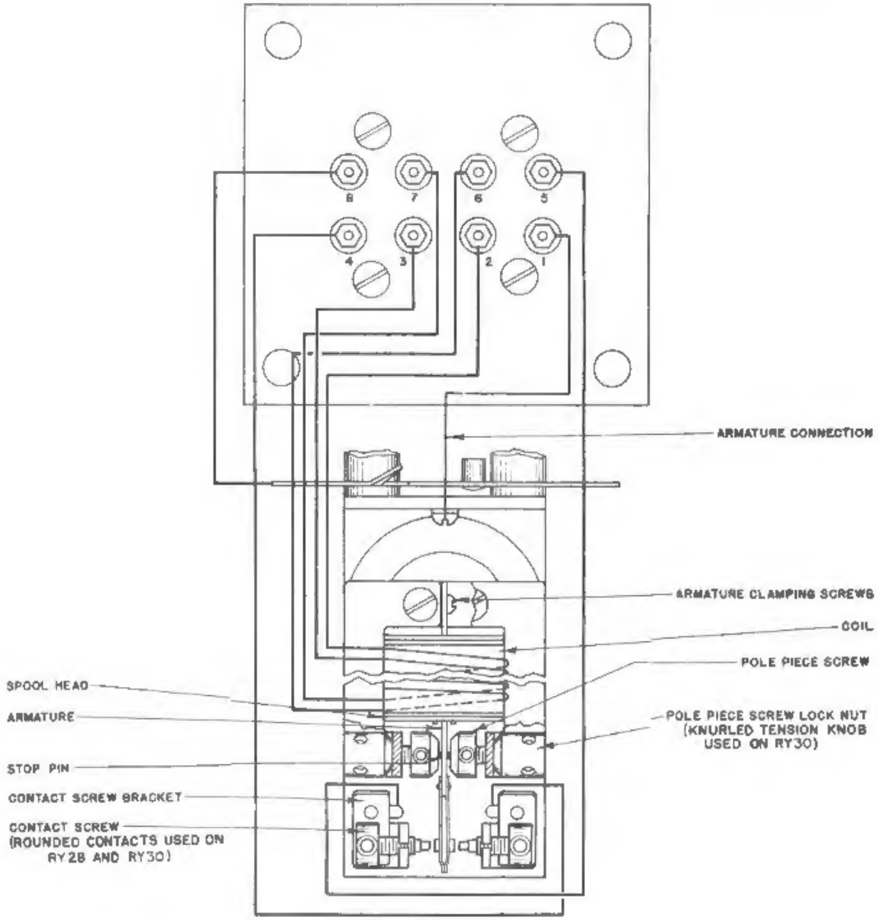


FIGURE I

VHF RTTY NEWS

RON GUENTZLER, W8BBB Editor
Route 1, Box 30
Ado, Ohio 45810

FUNDAMENTALS of RTTY

THE BAUDOT CODE

There are four sources of information regarding amateur RTTY:

1) THE NEW RTTY HANDBOOK, Byron H. Kretzman, W2JTP, Cowan Publishing Corp., 1962;
2) HAM RTTY, W2NSD/1 and W4RWM, 73 Inc., 1963;
3) 10 articles by Irv Hoff, K8DKC, Appearing in QST during 1965; and
4) "RTTY from A to Z", 24 articles by Durward Tucker, W5VU, appearing in CQ from 1964 AUG thru 1966 JUL.

The first two items mentioned above are handbooks and are currently available. The series of 24 articles by Durward Tucker plus 26 unpublished articles by him are to appear soon in handbook form under the title RTTY FROM A TO Z, published by Cowan Publishing Co. (CQ).

Before commencing with the Baudot code, let's review what was discussed last month. In the case of manual telegraphy, the person who is sending translates the letters to be sent into a code which he sends by opening and closing a circuit with a telegraph key. The person receiving receives the message by listening to the sounder which makes a click every time the circuit is opened and closed by the telegraph key at the sending end. The "receiver" (the person receiving) translates the series of clicks into letters and writes them down. The basic objections to this system are the slow speed and the requirement for a skilled operator to be present at each end of the circuit.

In the case of printing telegraphy (Teletype), the person sending depresses a key on the keyboard corresponding to the letter to be sent; this letter is mechanically translated into the opening and closing of contacts. These contacts replace the telegraph key. At the receiving end, a magnet operates and releases an armature in response to the contacts at the sending

In the case of printing telegraphy (Teletype), the person sending depresses a key on the keyboard corresponding to the letter to be sent; this letter is mechanically translated into the opening and closing of contacts. These contacts replace the telegraph key. At the receiving end, a magnet operates and releases an armature in response to the contacts at the sending end, and the armature, in turn, operates a selector which translates the opens and closures into the letter that was being sent.

The discussion ended with the concept that a different code than the one used with manual telegraphy was needed for use with teleprinters because a teleprinter, being a mechanical device, requires a code of uniform length regardless of the character being sent.

THE BAUDOT CODE

All printing telegraphy, until recently, used the five-element Baudot code. (Amateurs are still required to use it by law, but commercially it is rapidly becoming extinct.) The code is given in Table 1. Each row lists a separate character (or pair of characters) and each column corresponds to a "time-slot" or a "bit." The M in a particular location indicates that a mark is sent at that time and an S indicates a space.

In most cases, there are two characters corresponding to each row. This is necessayr because there are only 32 code combinations available in a five-element code. However, there are more than 32 characters that one would like to send. Therefore, most of the code combinations have to be used for two things. (What the two characters are may vary greatly from machine to machine. This will be discussed later.) As an example, the first row lists "A" and "–". Which is meant when the combination MMSSS is sent?

The answer is relatively simple. Why on a typewriter do some of the keys have just one character and some have more than one? For example, the "7" key also has "&". The answer, when considering a typewriter, is to keep the number of keys to a minimum. The answer, when considering a teleprinter, is that only 32 keys are permitted. The next question is: How do you tell a typewriter whether it is to print a "7" or an "&"? By shifting. There is a subtle point here. On a typewriter there are two kinds of shifts: 1) Locking, and 2) Non-Locking. On a teleprinter there is only one type: Locking. The shifting is done by hitting the FIGS or LTRS keys. When the LTRS key is depressed, the receiving machine performs a "stunt" rather than typing something; this stunt locks the printer in the necessary position to print the letters and characters appearing on the lower portions of the keys or the letters and characters appearing on the left side of the left column in Table 1.

When the FIGS key is depressed, the code sent from the keyboard is translated by the receiving machine to shift and lock into the position that will type what is on the upper portion of the keytops or what is shown in the right side of the left column in Table 1. Once the receiving printer is in FIGS it will remain there forever or until a LTRS is received. (Some printers are equipped with a "down-shift on space" arrangement whereby they shift to LTRS when LTRS or a character space is received. This is done for certain practical reasons that will be described later.)

THE ALPHABET

The FCC states in paragraph 97.69(a) of the Rules and Regulations: "A signal channel five-unit (start-stop) teleprinter code shall be used which shall correspond to the International Telegraphic Alphabet No. 2 with respect to all letters and numerals (including the slant sign or fraction bar) but special signals may be employed for remote control of receiving printers, or for other purposes, in "figures" positions not utilized for numerals. In general, this code shall conform as nearly as possible to the teleprinter code or codes in common commercial usage in the United States." Table 1 gives the CCIT Alphabet No. 2 referred to above.

The arrangement of most of the characters other than the letters and numerals varies greatly from machine to machine. The reason is that different users have different requirements. Ten of the "standard" codes can be found on p. 845 of REFERENCE DATE FOR RADIO ENGINEERS, 4th Ed., IT&T, 1956.

THE CODE ELEMENTS

Let's examine the meaning of the M's and S's in Table 1. Take, for example, the row in Table 1 corresponding to the letter "Y". Going across the row from left to right, the letters MSMSM appear. This means that when the "Y" key on a keyboard is depressed, the keyboard sends a mark, a space, a mark, a space, and a mark in that order. It sends them by closing, opening, closing, opening, and closing the keyboard contacts. If an oscilloscope were placed in series with the contacts, a pattern as shown in Figure 1 would appear.

Now look at the "A" row. The letters MMSSS appear. This means that the letter "A" is sent by sending a mark, a mark, a space, a space, and a space. The pattern appearing on an oscilloscope would be as shown in Figure 2. This may appear simple enough, but a little reflection may reveal two problems: 1) How does the receiving machine know when the first mark ends and the second begins, and 2) When does

Continued on page 18

TABLE 1
INTERNATIONAL TELEGRAPHIC
ALPHABET NO. 2

CHARACTER		TIME SLOTS				
		1	2	3	4	5
A	-	M	M	S	S	S
B	?	M	S	S	M	M
C	:	S	M	M	M	S
D	Who R U	M	S	S	M	S
E	3	M	S	S	S	S
F		M	S	M	M	S
G		S	M	S	M	M
H		S	S	M	S	M
I	8	S	M	M	S	S
J	Bell	M	M	S	M	S
K	(	M	M	M	M	S
L	)	S	M	S	S	M
M	.	S	S	M	M	M
N	,	S	S	M	M	S
O	9	S	S	S	M	M
P	0	S	M	M	S	M
Q	1	M	M	M	S	M
R	4	S	M	S	M	S
S	‘	M	S	M	S	S
T	5	S	S	S	S	M
U	7	M	M	M	S	S
V		S	M	M	M	M
W	2	M	M	S	S	M
X	/	M	S	M	M	M
Y	6	M	S	M	S	M
Z		M	S	S	S	M
Line feed		S	M	S	S	S
Carriage Ret.		S	S	S	M	S
LTRS		M	M	M	M	M
FIGS		M	M	S	M	M
Space		S	S	M	S	S
Blank		S	S	S	S	S

* * *

Long Tape Windup Made Easy -- --

TERRY BEELER, W4FUI
Rt. Box 260
Oak Hill Rd.
CANDLER, N. C. 28715

To those of you who have been laboriously winding up your tapes by hand, layer style (like a roll of motion picture film), read on. . .this method about to be described is for you.

With this method the picture tape is wound up in "Figure 8's" around the thumb and little finger of the left hand. This makes a neat bundle, and when tied as described later, makes for easy storage. For instance, they can be thumb tacked to the wall, each in it's own place and labeled, or hung overhead with clothes pins on a wire, like clothes hanging out to dry.

My good friend, George Becker, who is a commercial artist with Asheville TV station, WLOS-TV, was kind enough to make the accompanying sketches for me, so I can make good use of the old saw about a single picture being worth a thousand words. . .I tried to write this without the sketches, and boy oh boy, I couldn't understand it either! So, thanks, George!

So, let's get on with learning how: Get out one of your long picture or brag tapes, chad or chadless, it makes no never mind. Hold on to the beginning end and toss the remainder in a box or even on the floor (but be careful you don't step on it).

You are still holding onto the beginning end; now take a look at Figure 1, and place the tape as shown. Let several inches of the front end extend behind the left hand, and as you can see, the tape comes through flat between the first two fingers. Although not shown, take note that the bottom of the tape is against the second finger, the top of the tape is against the first finger.

Still looking at Figure 1, bring the tape around the thumb as shown in the sketch. Note that the bottom side of the tape is against the thumb, and makes a half turn as it comes across the palm, so that the bottom side of the tape can also be against the little finger.

Now look at Figure 2. Bring the tape on around the little finger and back across the palm, again turning the tape a half turn so that the bottom of the tape always faces the thumb, as it goes around. . .and repeat this maneuver over and over, until all the tape has been wound up in these Figure 8's around the thumb and little finger.

Practically all the work of winding up the tape is done with the right hand, which should be holding the tape between the thumb and first fingers, firmly yet light enough so that the tape can slide through the grasp. As the right hand is winding these Figure 8's, the left hand should rock back and forth, presenting first the thumb, and then the little finger, alternately, toward the right hand. This greatly facilitates the windup.

When all wound up, hold on tight and take a look at Figure 3. Remove the bundle of tape with the right hand as shown, carefully removing from the left hand.

As shown in Figure 4, wind the beginning end around the middle of the bundle two or three times, then a simple slipunder knot is tied, as shown in Figure 5. Leave several inches of the beginning end sticking out of the knot, which is used to clip onto with the clothes pin, or thumb tack. . .

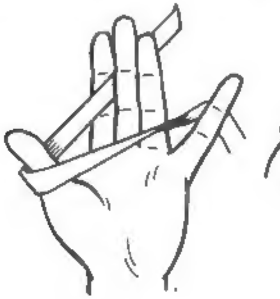
When you want to use the tape, carefully untie the knot and place the bundle in a small box under the tape hole in the 19 table, or otherwise near the Tee Dee. The bundle should be laid on it's back, with the beginning end facing up.

You will find that the Figure 8's will feed right out as the Tee Dee pulls the tape through, and will generally require a minimum of attention once the play back has gotten underway.

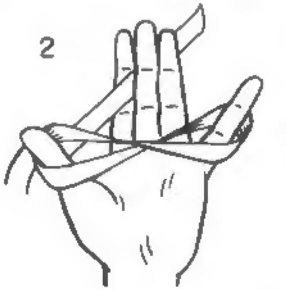
A word of warning, however; if the Figure 8's have been wound too tightly, and/or the storage time has been very long, the first few feet to come off with have the "twist" set into it, and will have a tendency to snarl. But it is easy to watch it for a few seconds and avoid this difficulty.

After a moment or two, you will find that it will take care of itself. Once you're off to a good start, don't hesitate to take off for a few minutes; it'll be ok when you get back!

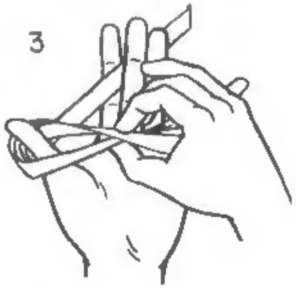
Give it a try. . .you will like this method A-OK!



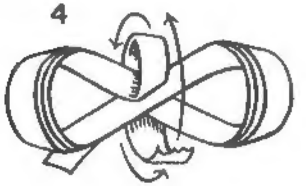
2



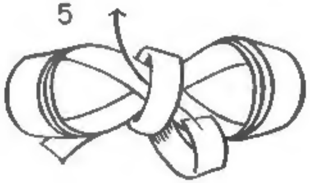
3



4



5



••••

Cheap, Easy Way for 170Hz FSK

Quick, Easy and Cheap way to 170Hz shift. Parts required - 2 alligator clips, and a 39 or 47 pf capacitor.

1. Wire 39 or 47pf capacitor to the alligator clips with short pieces of wire.
2. Clip capacitor across shift diode of the normal 850 Hz shifter. Keep leads as short as possible. Figure 1.
3. Resulting shift is between 150 and 190 Hz. (to return to 850 shift remove on clipped capacitor.
4. For a more precise shift use two capacitors, a 33 pf and a 3-12 ceramic trimmer across the diode, adjust the trimmer for exact 170 hz shift. Figure 2.
5. For more permanent installation, wire the extra capacitors in circuit and install switch to choose either shift. A single pole switch to cut the ground connection will work.

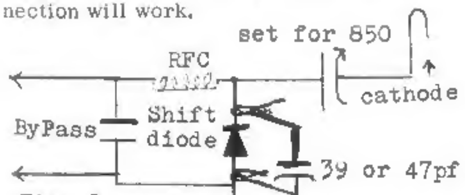


Fig. 1

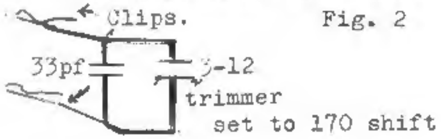


Fig. 2

•••

Adjusting FSK to 170Hz

REQUIRED - General Coverage Short Wave Receiver- - - -

Most people can pretty much check their 850 shift reasonably close. Unless you have a semi-counter (TT/O) or a digital counter 170Hz is not so easy, UNLESS you tune your receiver to the fifth harmonic of the transmitter and adjust the transmitter shift so that the presentation on the scope or other indicator is like that for 850 Hz shift. You will now have 170 Hz shift at the transmitter. This can then be used to calibrate and set the TU to the 170 Hz with the transmitter tuned to the fundamental frequency.

For example - the transmitter is put on 3.6 mHz and the receiver is tuned to 18mHz for the 850 Hz indication, it is then put back to 3.6mHz for setting the TU at 170 Hz.

•••

Stop Freqency Drift

Most of the drift that comes from many of the popular exciters on RTTY such as the DX100, B&W5100, 32Vs Valients etc. is caused by the VFO being turned off and on with each transmission. The reason for turning off is because it interferes with the incoming signals. If left running the drift would soon stop after warm up. The trick is to simply add a relay and a capacitor to shift the VFO cathode away from the receiver frequency during receive and allow it to come back on frequency during transmit. Alternatively a second diode shifter with a capacitor to pull it 10KC or so away will also work in place of the relay.

•••

RTTY-DX

JOHN POSSEHL - W3KV
Box 73 Blue Bell, Pa., 19422

Hello there . . .

Those of you that read the page starting at the very top perhaps notice a slight change in the masthead. It is the same old guy at the same old stand but the change in the call sign is the result of a recent change in amateur regulations in the U.S.A. and comes under the broad term, incentive licensing. The stateside boys are pretty well acquainted with the facts, but for the benefit of the DX stations, it was very well explained on the cover of the October '67 issue of The RTTY JOURNAL. As far as I can see, the one thing it really does is that from now on when the fellow says "good evening old man", he really means "old man". You will probably see some of the old familiar calls replaced by strange new ones as time goes on. I am aware of one other so far, "old" W2LNP is now W2BK.

The annual Spring BARTG contest has just ended and I think that all who took part will agree that conditions were just about perfect and the activity was excellent. Thanks to Arthur, ON4BX, and Jean, FG-7XT, we are able to give a brief report from both sides of the ocean before the column deadline. Arthur never intended to get into it and started late to make a few contacts but found himself still giving out numbers until the very end. Art totalled 127 QSO's in 54 band/countries and WAC. Jean was really in there with 176 QSO's in 58 band/countries and WAC. Your scribe had 95 QSO's, 44 band/countries and WAC. Both Arthur and Jean indicate that perhaps Giovanni, I1KG, and Skipper, W2RUI, will be the ones to watch for on the top of the pile. Well, we will have to wait for the official results to see what happened. I suppose that this fellow Murphy took his toll. A buddy of mine W3ISE spent a good part of the weekend wrestling with a hot soldering iron, but did very well in spite of it. The opinion from here is that some of the rare stations like SV0WL may have been present if it were not for the conflict with the ARRL fone contest. Cas, KA9AK, was in there to give the boys Japan on Ten but he also put in a lot of time at KA9MF in the fone contest. WAC this year was almost a breeze on a couple of bands with both Cas, KA9AK, and Ven, VU2KV, giving out numbers from Asia and with Africa very well represented by Orbra at EL2N, and Chris, at ZS6BCT. I know that a few of you fellows made WAC on at least two bands and I'm sure that someone made it on the three higher bands as it was very possible with conditions and activity being what they were. The excellent operating technique of Orbra at EL2N kept the mob spread out and off his frequency enabling him to keep giving out contacts without losing time in endless repeats. Orbra also tells us his friend is now licensed as EL2AY and hopes to be on soon. A brief resume of stations on during the contest might be in order. It is no doubt incomplete and we will try to bring it up to date next month when we have more reports. KL7FRX - FG7XT - VE4FG - I1KG - W3ISE - EL2N - XE1YJ - UA4KED - KH6FOX - ZL2ALW - VK3DM - G6JF - ON4BX - LX2FB - YV5AVW - F3PI - UQ2AB - OZ6OB - SM0KV - PE2EVO - VO1BL - VU2KV - PJ2MI - PJ2CR - KA9AK - CE3EX - HA5FE - ZS6BCT - OA4BR - LU7EBB - KP4JM. You might also keep in mind that if you worked twenty-five different countires you will be eligible for the QCA Award issued by the BARTG. If you think you made it send a dollar or equivalent along with your score and you may receive a new certificate without the bother of having to send the QSL cards and also hoping that the other chap submits his score. Of course, by the same token if you have ten cards and worked fifteen new ones in the contest send the cards you have and claim the balance from the contest score. Please be patient for an answer as these things take time to correlate and all scores have to be in before it can be done.

This month we have a new W A C member - Nr. 102 - Charles Latham - W5QCH

Congratulations Charlie, and after this contest there should be a few more applicants soon.

There has been a lot of interesting chatter about new countries that should be showing up on the bands soon, but let's clear up some old business first. The anticipated operation from Fanning Island that was due in early February ran into some transportation problems and this caused a couple of weeks delay. The group eventually got going in late February using the call VR3DY, and although the pile-ups were heard on SSB no activity was noticed on RTTY. If anyone has a closing story on this one we will be glad to print it. (The printer was left in Hawaii, (Dusty) via KH6FOX.)

Jean, FG7XT, reports a QSO with CO8MN but apparently has some reservations about it until he gets a card. However, I heard this station on CW during the ARRL DX contest. In late February I printed a station testing and signing VP8US, in the Falkland Islands. He said his name was Guy but I got no response to my frantic calls and haven't heard him since. Anyone else know anything about this one?

Now for a look into the future. In a recent QSO with I1KPK, Mauro indicated a possible Dxpidition to YU at around Easter which would make it the week-end of April 14. Mauro you may recall operated with I1KG from Sardinia during the CARTG contest last October.

Herbert, DL1VR, plans operating as TA1AH, either in late May or early June. This would make another station in Asia so keep the printers oiled.

Jean, FG7XT, indicates that he has reciprocal licensing privileges from the U.S. and is thinking of getting on from KV4 one of these days. Let's hope that Jean can swing it later this year.

Arthur, ON4BX, has been helping to get F9RY/FC back on RTTY. Pierre has a machine but no convertor and Arthur has built one and is sending it to Corsica. This could mean RTTY from FC soon after you read this.

A recent letter from Bud, W6CG, to Dusty had some really bad news regarding Eric, VK3KF, but we are happy to report that the worst is over. Eric suffered another heart attack at about the end of the year that made him completely inactive for a while. He is now back on his feet again a few hours a day and we were happy to hear him on during the contest. I know that a short note of encouragement will do more than medication to raise Eric's spirits so drop him a line when you have a moment.

Bud has been active from his new location and still gets into VK and Japan quite regularly but conditions are not so favorable toward the East which is the reason we don't hear more of Bud in these parts. Next time you do hear W6CG on the bands give him a blast. He will sure be glad to hear from you.

In closing I want to mention that I received several changes for the RTTY - DX Honor Roll after the column deadline and as a result they did not reflect in the last listing. They will be noted in June however but please keep in mind that I must have any information for publication by the 1st of the month at the latest.

This year all conditions are "go" for the Dayton Hamvention so hope to see some of you fellows that I've met on the keyboard and via the mails so many times.

73 de John

.....

Mr. Dusty: I have a gripe
About this thing called Teletype.
When I got this beast I tore it down
and with some gunk I went to town.
I cleaned it here and I cleaned it there
I brushed and scrubbed it everywhere.
I greased and oiled it up real good
the way the book said I should.
Got it back together with a bit of work
then threw the switch and it began to perk.
Made a few adjustments, the loop current too
then pressed a key and a type bar flew.
Sent a few RY's and a fox for a test
the alphabet, numerals and the rest.
Now it's working in real fine style
so I feel I've got the right to smile.
But it's at this point I get confused
the keyboards different from what I've used.
The main trouble is this, my friend
not what I print but what I send.
So Mr. Dusty your advice please
on educating these "Darn Green Keys".

Howard W6URP

.....

BROAD MINDED ?

TRY NARROW SHIFT !

.....

HITS & MISSES

From The Editor and his Mail

One thing we have learned - we no longer try to get "Eight great big tomatoes in a itty bitty can". As of the last couple of issues we try to allot enough space for drawings to be legible. May mean a little less reading matter but you can stop the search for a magnifying glass.

•••

Hopefully soon after this issue reaches you Crys and I will be spending a couple of weeks in Nassau and Florida. We have most of the May issue pasted up and only have to prepare the ads and several timely columns when we get back so hope to have it in the mails on time. We will have all mail picked up but of course be unable to answer any until after we return and get the issue to the printers. So have patience if you write. Speaking of Nassau wonder why some of the Florida boys don't make a DXpedition over there and put a scarce country on RTTY.

•••

Our subscribers are a wonderful bunch except for one thing. They are too darn modest - Where are the pictures of you and your rig we hoped to get? We would particularily like to get pictures of some of the foreign readers and their rigs but we do want the operators as well as the rigs. Frankly we thought we would get more than we could run. Shows how wrong we are at times.

•••

The Dayton Hamfest April 27th at Wamplers Arena, has one of the largest gatherings of RTTY fams of any convention. This years program will inaugurate a Table Clinic - rather than conventional speakers, a number of experts will take charge of different table with different subjects at each table. It is hoped to have various types of equipment on display so that the answers can be both oral and visual.

If you can make it - DO, and make special plans to be at the RTTY suite in the Dayton Sheraton Hotel Friday evening April 26th. "Ron" W8BBB of the VHF column, and John W3KV will be on hand along with the editor to greet you. The program at the hamfest includes Keith, W8SDZ, Tom, K8ERV, Jerry, W8GPB, Truman K8JUG as well as the two Journal columists. The RTTY room will be open from Friday afternoon until late Saturday night.

•••

We had the privilege of seeing one of the new high speed Teletype machines that prints with a stream of ink dots from a nozzle. This is a master understatement of how it works but it does work. If you can imagine words and lines appearing on your printer at the rate of 1100 (eleven hundred) words per minute (you can't begin to read that fast) you can imagine the fascination of watching this machine. We had heard of it and now we have seen it but more and more I am sorta glad that I am growing old and don't have to keep up with all the new inventions. Anybody have an isolated island where only vacuum tubes are allowed?. . .

•••

Along these lines we have a clipping from WA8BOT of a teleprinter (that is what they call it) made by the National Cash register Co. Uses heat, only one moving part, and has run 44,000 hours without maintenance. Works by sending electrical pulses through a pattern of thin film conductors in contact with sensitive paper, generating heat and thus printing on the special paper. It is small, a pretty girl is holding it in her hands, can be worked via radio signals but except for the pretty girl, is still a mystery to me and I am still looking for that island.

••••

Delivery of our binders to hold a years copy of RTTY JOURNAL have been promised for March 20th. They will be in a maroon vinyl cover with RTTY JOURNAL in Gold imprinted, a clear plastic pocket in front allows space for any special information or the year date to be enclosed. They will sell for $2.50, postpaid. Next month we hope to have a photo and complete information available.

••••

••••

The Canadian Radio Teletype Group, CARTG, have finished their first year under the energetic leadership of "Sid" VE3GK with over 30 members. Interest has been aroused in the entire country with all districts represented except VEI and that is being worked on. A newsy mimeographed bulletin is mailed to all members and interested fans in Canada, if you wish more information write VE4RTT, 85 Fifeshire Rd. Willowdale Ontario. Narrow shift for CW ID is now legal in Canada we understand.

••••

Also received a 40 page Newsletter from the BARTG Society of Great Britain. We were surprised to see that they have about 500 members. Although we ship over 60 copies of the Journal to Great Britain most of the activity must be on local frequencies as there are very few active calls on the DX bands. Lets hope that a number showed up for their Contest the first of this month.

•••••

Check Your Renewal Date

Check your address stencil for expiration date of your subscription. The month and last numeral are the month and year of your expiration.

On your address stencil the month and year of the expiration of your present subscription are coded by an abbreviated month and figure. The figure being the last digit of the year. Dec. 8 - means the last issue on your subscription is December 1968.

ONLY back issues available are - July through December 1966, April and December 1967 and all of 1968. Copies are 30¢ each. Reprints of the TT/L-2 article are still available at 25¢.

•••

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P.O. Box 837 — Royal Oak, Michigan 48068
"Dusty" Dunn — W8CQ
Editor & Publisher

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PITCHS We SWUNG At and MISSED !

February Page 17, we omitted the W0 rating, in case you have been worrying they rate 6th among call areas in subscribers. (Now we will get letters from 9 other call areas saying "who in ell cares".

March page 2 - additional numbers for the parts to the model 15 light. Socketts-GE95X-432-Ballast #89-G-435. Incidentally this is a nifty light - don't be afraid to try it.

As one reader says; A second generation error -- Go back to February issue page 7 and change R5 to 500 ohms instead of 500K ohms. In our first correction we said it was R4.

••••

RTTY JOURNAL Binders Available

LAST MINUTE NOTE - We have just received the shipping notice of the RTTY BINDERS mentioned elsewhere in this issue. They should be here before this reaches you. Full details next month but if anyone is in a hurry we have them now. Remember we will be away from March 28th to April 10th, however so will not be able to ship anything between those dates. $2.50 postpaid.

••••

HOW is my NARROW-SHIFT ?

Courtesy CARTG

VHF continued

Continued from page 11

the first mark begin? The answers to both these questions have some subtle implications.

In order to answer the first question, let's ask another question: When you copy a CW signal how do you know the difference between a dot and a dash? A dash is three times as long as a dot. You use a "mental clock" when receiving CW; you can tell whether they are dots or dashes by how long they last.

The receiving mechanism in a teleprinter also employs a "clock" or timing mechanism. The machine "knows" how long a mark is supposed to be. If a mark lasts "too long" it must be another mark!

The timing situation with printing telegraphy is more severe than it is with CW. When receiving CW you only have to be able to tell the difference between marks that differ in length by a ratio of 3 to 1. By looking at Table 1 it can be seen that the characters E, A, U, K, and LTRS contain 1, 2, 3, 4, and 5 successive marks, respectively; the receiving teleprinter must be able to "time" with enough precision to distinguish between these five characters. The receiving machine can perform this feat only by running at exactly the same speed as the keyboard on the sending machine.

The same discussion regarding successive marks can be applied to successive spaces. Again, the answer is that the receiving machine must run at the same speed as the transmitting machine in order to accurately time the signal and thus correctly decode it.

In amateur telegraphy, the length of a "time-slot" (a single mark or a single space) is 22 ms (0.022 seconds). For example, in the oscilloscope pattern in Figure 1 each mark and each space is exactly 22 ms long. In the pattern shown in Figure 2, the mark is 44 ms (2 X 22) long and the space is 66 ms (3 X 22) long.

Now to question 2. On a letter that starts with a mark, such as "A", what comes before the mark? An obvious answer, if we consider CW, is: A space. Therefore, we could say: If a space exists before a character, the beginning of any character is indicated by the transition from a space to a mark. Right? Well, try this: What does Table 1 give as the code for "C"? SMMMS. Now, if the beginning of a character is indicated by the start of a mark, when does the letter "C" begin? The answer to this paradox is that something must be sent before every character in order to tell the receiving machine that a character is coming. Before describing how this is done, a "peculiarity" of printing telegraphy must be described. Therefore, we will wait until next month for the description. We will say, however, that both a mark and a space must proceed a character.

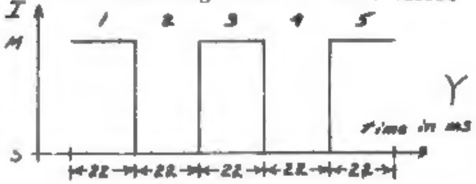

FIGURE 1

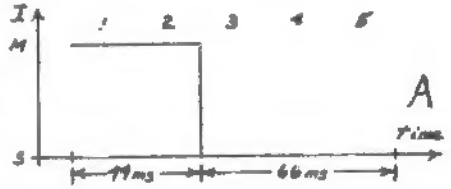

FIGURE 2

SUMMARY

The five-element Baudot code was described. In order to obtain more than 32 characters it is necessary to use some code combinations for more than one character. This is done in a manner analogous to that employed on a typewriter. By shifting the machine, most of the keys are used for two separate characters. The shifting is done by means of the LTRS and FIGS keys.

Because the receiving machine must "time" the incoming signal in order to decode it, the two machines must run at exactly the same speed. Because half the characters in the Baudot code start with a mark and the other half with a space, the receiving machine must be told when a character starts. Next month, the method for telling the receiving machine when a character starts will be described.

73, ES CUL, RG.

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